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भारतीय मानक

बांस-पटसन कंपोजिट के पल्ले के दरवाजों के शटर — विशिष्टि

Indian Standard

BAMBOO-JUTE COMPOSITE PANEL DOOR SHUTTER — SPECIFICATION

ICS 83.120; 91.060.50

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

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Doors, Windows and Shutters Sectional Committee, CED 11

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Doors, Windows and Shutters Sectional Committee had been approved by the Civil Engineering Division Council.

Due to scarce availability of suitable timber from natural forests, various substitutes of timber are being developed and used in manufacture of various wood products including door shutters. Bamboo-jute composite is one such substitute material which has been used in the manufacture of door shutters. Bamboo is available in abundance in the country, especially in the north eastern region, is a renewable natural resource and grows very fast. In combination with jute and other suitable natural fibres the composite provides a suitable substitute to timber. Further the use of phenol formaldehyde resin enhances the stability of the product in different climatic conditions. Panel door shutters made from phenol bonded bamboo-jute composite is being manufactured in the country and has been successfully used in a number of rehabilitation projects in tsunami and cyclone affected areas of the country. A need was felt to develop this standard in order to provide guidance on quality and performance requirements of the product.

Notwithstanding the advantages of modular coordination, it has been noticed that there is sufficient demand for door shutter of sizes other than modular sizes. In view of the above, the standard permits non-modular sizes in addition to the modular sizes. Non-modular sizes are particularly required in maintenance/replacement works of existing door shutters.

The composition of the Committee responsible for the formulation of this standard is given in Annex B.

For the purpose of deciding whether a particular requirement of this standard, is complied with, the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 1960 ‘Rules for rounding off numerical values (*revised*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

BAMBOO-JUTE COMPOSITE PANEL DOOR SHUTTER — SPECIFICATION

1 SCOPE

The standard lays down requirements on size, material, construction, workmanship, finish, tests and sampling of bamboo-jute composite panel door shutters for use in residential and industrial buildings.

2 REFERENCES

The standards given at Annex A contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed in Annex A.

3 TERMINOLOGY

For the purpose of this standard the definitions given in IS 707, IS 13958 and IS 15476 and the following shall apply.

3.1 Bamboo-Jute Composite — Sheets or boards made up of polymer thermosetting resin applied to bamboo mats and mats made with jute, assembled and pressed (compression moulded) under high temperature and pressure.

3.2 Bamboo Mat — A woven sheet in suitable geometric pattern using bamboo slivers.

3.3 Jute Mat — Jute threads woven into a coarse cloth.

3.4 Type Test — Tests carried out to prove conformity with the standard. These are intended for product/type approval of a given construction or a prototype of door shutter.

3.5 Acceptance Test — Tests carried out on sample taken from a lot passing type tests for the purpose of acceptance of the lot on a batch to batch basis.

4 HANDLING

Handling and direction of closing of shutters shall be designated in accordance with IS 4043.

5 MATERIAL

5.1 Bamboo Mat and Bamboo Sliver

Bamboo mat required for the manufacture of the door shutters shall be compactly woven in suitable pattern from slivers of uniform thickness and width. The thickness of slivers shall be in the range of 0.6 mm to 0.8 mm and with a minimum width of 5 mm. Care shall be taken to exclude the slivers with epidermal (outermost skin) and endodermal (innermost skin) layer. However, presence of epidermal layers up to a maximum of 10 percent of the width of the silver and only on either edge shall be permitted.

5.2 Jute Mat

Jute mat used shall be of minimum mass of 450 g/m^2.

5.3 Adhesive

Resin shall be of phenol formaldehyde type conforming to BWP grade of IS 848, with or without fillers and/or other additives.

6 SIZES

Sizes of the door shutters shall generally conform to the modular sizes specified in Table 1. Sizes other than modular sizes as agreed to between the manufacturer and the purchaser may also be permitted. The nominal thickness of the shutters shall be as specified in Table 1. For sizes other than modular sizes the nominal thickness of the shutters shall be as agreed to between the manufacturer and the purchaser but shall not be less than that specified for the nearest higher modular size of shutter given in Table 1.

7 CONSTRUCTION/FABRICATION

7.1 Stiles and Rails

Unless otherwise agreed to between the purchaser and manufacturer, the stiles and rails of the door shutters shall generally conform to the width and thickness specified in Table 2 (*see also* Fig. 1) and shall be made up of bamboo-jute composite.

7.2 Panels

Panels of the door shutter shall be made of single piece, minimum 6 mm thick bamboo-jute composite. The number of panels and placing of door shutters panels may be as agreed to between the purchaser and the manufacturer.

8 LOCATION OF FITTINGS AND ACCESSORIES

Door shutters shall be shop-prepared for taking

Table 1 Dimensions and Thickness of Shutters

(*Clause* 6)

All dimensions in millimetres.

Sl No.	Designation of Doors	Size		Thickness
		Width	Height	
(1)	(2)	(3)	(4)	(5)
i)	8 DS 20	700	1905	25
ii)	8 DS 21	700	2005	25
iii)	9 DS 20	800	1905	25
iv)	9 DS 21	800	2005	25
v)	10 DS 20	900	1905	25
vi)	10 DS 21	900	2005	25
vii)	12 DT 20	1 100*	1905	30
viii)	12 DT 21	1 100*	2005	30

NOTES

1 D = Door, S = Single leaf shutter and T = Double leaf shutter.

2 The designation indicates the size of the door opening, the first number referring to width in modules of 100 mm and the last number the height in modules of 100 mm.

3 Symbol (*) indicates that the dimension is of combined width of two shutters in closed position.

4 Standard sizes of wooden door frames are covered in IS 4021 and that of steel door frames in IS 4351. Standard size of bamboo-jute composite door frame is considered as 70 mm × 50 mm.

5 In arriving at the standard height and width of door shutters an allowance of 60 mm has been made for wooden/steel door frame, 50 mm for bamboo-jute composite door frame, 40 mm for floor finish, 5 mm for clearance all round between the door opening and the door frame and 15 mm for rebate all round for the door shutter into the door frame. Further, a gap of 5 mm is considered between the bottom of the shutter and the finished floor level.

hardware like tower bolt, aldrop and handle. Solid portion of bamboo-jute composite sheet/board shall be provided for fitting hardware, which shall be marked at the time of supply. As agreed to between the manufacturer and the purchaser, shutters shall be shop-prepared for fixing of mortize locks or latches with suitable bamboo-jute composite sheet/board.

Table 2 Dimensions of Stiles and Rails

(*Clause* 7.1)

All dimensions in millimetres.

Sl No.	Description	Width	Thickness
(1)	(2)	(3)	(4)
i)	Vertical stiles and top rail	100 ± 3	25 or 30 ± 1
ii)	Lock rail	125 ± 3	25 or 30 ± 1
iii)	Bottom rail	125 ± 3	25 or 30 ± 1

9 WORKMANSHIP AND FINISH

9.1 All the four edges of the door shutter shall be square. The shutter shall be free from twist or warp in its plane. The surface of door shutters shall be generally of smooth finish. Minor deviations from the smooth finish without impairing the strength or performance of the shutters may be permitted.

9.2 Both faces of the door shutters shall be sanded to a smooth even texture.

9.3 If required by the purchaser, door shutters shall be primer coated.

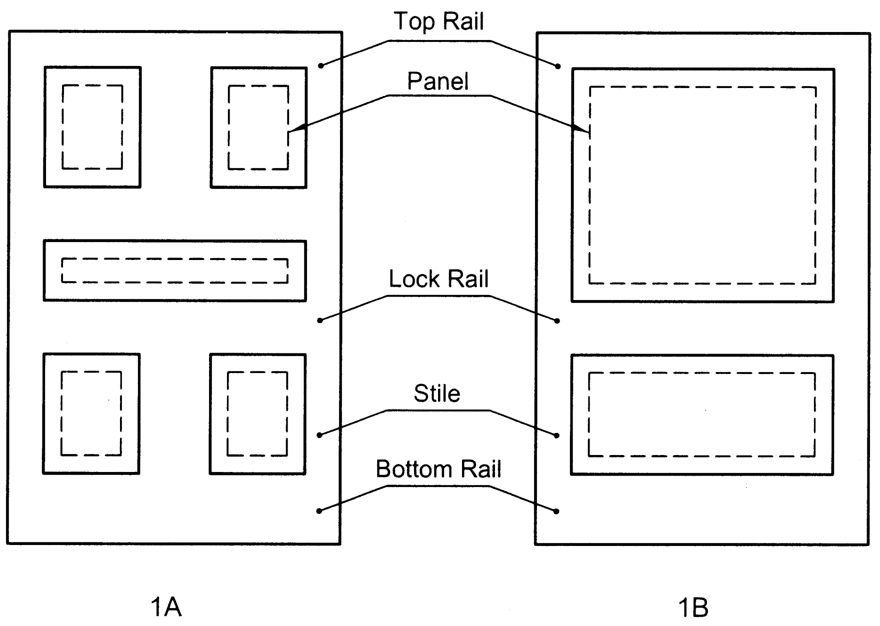

Fig. 1 Typical Illustration of Panel Type Door Shutter

10 TESTS

10.1 Classification of Tests

10.1.1 *Acceptance Tests*

The following tests shall constitute acceptance tests:

a) Dimensions and squareness test,
b) General flatness test,
c) Local planeness test,
d) Impact indentation,
e) Slamming test, and
f) Glue adhesion test.

10.1.2 *Type Tests*

The following tests shall constitute type tests:

a) Dimensions and squareness test,
b) General flatness test,
c) Local planeness test,
d) Impact indentation,
e) Edge loading test,
f) Shock resistance test,
g) Buckling resistance test,
h) Slamming test,
j) Misuse test,
k) Screw withdrawal resistance test,
m) Glue adhesion test, and
n) Varying humidity test.

11 REQUIREMENTS

11.1 Dimensions and Squareness Test

When tested in accordance with IS 4020 (Part 2), the dimensions of nominal width and height of door shutters shall be within in a limit of ±5 mm. The door shutter shall not deviate by more than 2 mm on a length of 500 mm. The thickness of the door shutter shall be uniform throughout with the permissible variation of not more than 0.8 mm between any two points. The nominal thickness of the shutter shall be within a limit of ±2 mm.

11.2 General Flatness Test

When tested in accordance with IS 4020 (Part 3), the twist, cupping and warping in door shutters shall not exceed 6 mm.

11.3 Local Planeness Test

When tested in accordance with IS 4020 (Part 4), the depth of deviation measured at any point on either at stiles and rails or at panels of door shutters, shall not be more than 1 mm.

11.4 Impact Indentation Test

When tested in accordance with IS 4020 (Part 5), door shutter shall have no defect such as crack or delamination and depth of indentation shall not more than 0.2 mm.

11.5 Edge Loading Test

When tested in accordance with IS 4020 (Part 7), the deflection of the edge of door shutters at the maximum load shall not be more than 5 mm. On removal of the loads, the residual deflection shall not be more than 0.5 mm, failing which the test may be repeated on the other edge in the reverse direction. Also there shall be no lateral buckling by more than 2 mm during loaded condition and no residual lateral buckling after removal of the load.

11.6 Shock Resistance Test

11.6.1 When tested in accordance with **2.1** of IS 4020 (Part 8), there shall be no visible damage in any part of the door after twenty five blows on each end.

11.6.2 When tested in accordance with **3.1** of IS 4020 (Part 8), the normally hung shutter with hangings, fixings and fastening should withstand without any significant permanent deformation and without deterioration five impacts on both sides of the shutter.

11.7 Buckling Resistance Test

When tested in accordance with IS 4020 (Part 9), door shutters shall not show any deterioration and any residual deformation more than 10 mm after 15 min of unloading. The initial deflection, after 5 min of application of load, shall also not be more than 100 mm.

11.8 Slamming Test

11.8.1 Any one of the following tests given in **11.8.2** and **11.8.3** shall be used.

11.8.2 When tested in accordance with **2.1** of IS 4020 (Part 10), the door shutter shall not have any visible damage in any part of the door at the end of 50 successive impacts.

11.8.3 When tested in accordance with **3.1** of IS 4020 (Part 10), the door shutter shall not have any visible damage in any part of the door at the end of 100 successive impacts.

11.9 Misuse Test

When tested in accordance with IS 4020 (Part 11), there shall not be any permanent deformation of the fixing or any other part of the door set, hindering its normal working after the test.

11.10 Screw Withdrawal Resistance Test

When tested in accordance with IS 4020 (Part 16), the required load to withdraw the screw completely from door shutters shall not be less than 3 000 N.

11.11 Glue Adhesion Test

When tested in accordance with IS 4020 (Part 15), the door shutters shall be considered to have passed the test, if no delamination has occurred in the glue lines or if no single delamination of more than 50 mm in length and more than 3 mm in depth has occurred in the assembly glue lines between the face skins and sub-assemblies. The panel shall also be examined for decomposition. The panel shall not disintegrate at the end of the test. A door shutter shall be deemed to have passed the test, if both the specimens meet the above requirements.

11.12 Varying Humidity Test

When tested in accordance with IS 4020 (Part 12), there shall be not be any visible warping, twisting or delamination in the door shutters and where precision is required the maximum departure from the local planeness shall not be more than 2.0 mm. The recovery of the original size after subjecting the door shutter to high and low humidity shall be at least 90 percent of the change in dimension.

12 SAMPLING AND CRITERIA FOR CONFORMITY

12.1 Lot

In any consignment, all the shutters manufactured under similar conditions of production shall be grouped together to constitute a lot.

12.2 Sample Size

12.2.1 The number of sample to be taken for testing of shutters for dimensions and squareness test, general flatness test and local planeness test shall be in accordance with col 3 of Table 3.

12.2.2 For impact indentation test, slamming test and glue adhesion test, the number of shutters shall be as in col 5 of Table 3.

12.2.3 Type tests shall be carried out once in a year and whenever, the design and construction is changed.

12.3 Criteria for Conformity

The lot shall be considered as conforming to the requirements of the standard when the number of defective samples does not exceed the permissible number given in col 4 of Table 3.

Table 3 Sample Size and Criteria for Conformity
(*Clauses* 12.2.1, 12.2.2 *and* 12.3)

Sl No. (1)	Lot Size (2)	Sample Size (3)	Permissible No. of Defective (4)	Sub-Sample Size (5)
i)	25 to 50	8	0	1
ii)	51 to 100	13	1	2
iii)	101 to 150	20	1	2
iv)	151 to 300	32	2	3
v)	301 to 500	50	3	4
vi)	501 and above	80	4	5

NOTE — For lot size 25 or less, number of samples to be taken for testing shall be as agreed to between the manufacturer and the purchaser.

13 MARKING

13.1 Each door shutter shall be legibly and indelibly stamped or marked by any suitable method with the following information:

a) Name of the manufacturer or trade-mark, if any;
b) Lot No./Year of manufacture;
c) Whether the size of the shutter is 'Modular' or 'Non-modular';
d) Nominal dimensions.

13.2 BIS Certification Marking

The shutters may also be marked with the Standard Mark.

13.2.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act,* 1986 and the Rules and Regulations made thereunder. The details of conditions under which a licence for the use of the Standard Mark may be granted to manufactures or producers may be obtained from the Bureau of Indian Standards.

ANNEX A

(*Clause* 2)

LIST OF REFFERED INDIAN STANDARDS

IS No.	*Title*
707 : 2011	Glossary of terms applicable to timber technology and utilization of wood, bambao and cane (*third revision*)
848 : 2006	Synthetic resin adhesives for plywood (phenolic and aminoplastic) — Specification (*second revision*)
4020 (Parts 1 to 16) : 1998	Door shutters — Methods of tests (*third revision*)
4021 : 1995	Timber door, window and ventilator frames — Specification (*third revision*)
4351 : 2003	Steel door frames — Specification (*second revision*)
4043 : 1969	Recommendations for symbolic designation of direction of closing and faces of doors, windows and shutters
13958 : 1994	Bamboo mat board for general purposes — Specification
15476 : 2004	Bamboo mat corrugated sheet — Specification

ANNEX B

(*Foreword*)

COMMITTEE COMPOSITION

Doors Windows and Shutters Sectional Committee, CED 11

Organization	*Representative(s)*
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